

Gardenstown Landslide Ground Investigation

Progress Report

Project:	Gardenstown Landslide Ground Investigation	Originated:	Stephen Barcroft
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1 Introduction

The following represents a progress summary of the Gardenstown Landslide Ground Investigation works completed between Monday 26/02/2018 and Friday 02/03/2018 (Week 3) by BAM Ritchies Ltd (BAM).

It should be noted that Atkins staff were not on site from Wednesday 28/02/18. The following report is based on observations made during the first two days and information provided by BAM Ritchies Ltd.

2 Health and Safety

2.1 General

There have been no reportable injuries or dangerous occurrences.

Non-site personnel required to pass through fenced areas on occasion to access lower portion of Gardenstown. If operating, the rig was turned off and non-site personnel escorted through area.

In the event of an emergency, first point of contact is Alistair Millar from Aberdeenshire Council, followed by Jonathan Duncan and/or James Black.

2.2 Equipment Certification

Cable percussive, rotary coring and windowless sampling rigs noted to all be within current service period.

Spill kits are present on site and are held by drill crew.

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2.3 Compound

Groundhog welfare and office unit located to laydown area at Greenskyes Farm - unit in acceptable water tight condition with electricity sourced from in-built diesel generator. Second mobile welfare van available for operatives at Gardenstown site. Water supply functioning within both groundhog unit and welfare van.

First aid kit stored within 4x4s with each drill rig and both welfare units.

3 Weather and Ground Conditions

The weather has varied over Week 3. An amber warning for snow in was issued by the Met Office on Wednesday 28 February for the north east of Scotland. The inclement weather has had no affect progress on any day, nor been observed to affect landslide while Atkins representative on site. A daily breakdown of the typical weather conditions is provided in Table 1.

Table 1. Overview of Weather Conditions Week 1

Day	Date	Morning Conditions	Afternoon Conditions
Monday	26/02/18	Clear skies, cold	Clear skies, cold
Tuesday	27/02/18	Snow showers	Snow showers
Wednesday	28/02/18	Snow showers	Snow showers
Thursday	01/03/18	Snow showers	Snow showers
Friday	02/03/18	Snow showers	No works
Saturday	03/03/18	No works	No works
Sunday	04/03/18	No works	No works

4 Mobilisation

4.1 Compound

No additional compound equipment was noted to be mobilised during Week 3.

4.2 Plant

No additional plant was seen to be mobilised during Week 3.

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5 Personnel, Plant and Equipment

Table 2 provides a general record of persons on site during Week 3 of the Contract. The list is compiled for information purposes only detailing personnel applicable to the ground investigation works and all persons mentioned may not have been present all of the time.

Table 2. Personnel on Site

Atkins Site Staff	BAM Site Staff	BAM Site Operatives
Stephen Barcroft (Investigation Supervisor)	Sam Beynon (Site Engineer)	1 no. 2 man Cable Percussive Drill Crew
	John Munro (Foreman)	1 no. 2 man Rotary Drill Crew

6 Progress

6.1 General

Works undertaken in Week 3 comprised window sampling, dynamic probing, rotary coring drilling, and fitting of installations.

6.2. Cable Percussive Boreholes

No cable percussive boreholes were completed or scheduled during Week 3.

6.3 Rotary Boreholes

A total of 3 no. rotary coring boreholes were completed during Week 3 within the church car parking area. This brings the total number completed to 5 no. No further rotary coring is scheduled to occur. Rotary open hole drilling may be conducted during works on slope during Week 4.

The completed boreholes (BH03, BH04 and BH05) encountered strong fractured interbedded siltstone and sandstones.

The following periods of inactivity were noted for the rotary rig;

- 27/02/18; Rig was required to be demobilised from the position by 4:30pm in order to allow the grit truck to access the lower area of Gardenstown.

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6.4 Windowless Sample Boreholes.

A total of 3 no. windowless sample boreholes were completed during Week 3.

2 no. of the boreholes (BH06 and BH10) were completed along the viewpoint footpath and encountered bedrock at shallow depths.

An additional borehole (BH11) was completed in the grassed area behind the church and encountered very soft clay overlying siltstone bedrock at 2.5m bgl.

The following periods of inactivity were noted for the rotary rig;

- 27/02/18; Issue with broken welds at base of terrier rig mast at 9:30am. The welds were repaired by a MacDuff Shipyard welder by 1:30pm.

6.5 Cable Percussive, Windowless Sample and Rotary Core Boreholes

The combined progress of cable percussive boring, windowless sample drilling and rotary coring are summarised in Figure 4. This provides a useful summary of the three elements. The works completed to date suggests sufficient progress to achieve the programme.

6.6 Installations

During Week 3, 4 no. installations were fitted within the completed boreholes. The installations are summarised below;

- BH03 was fitted with a standpipe in bedrock deposits.
- BH04 was fitted with inclinometer to full depth.
- BH10 was fitted with a standpipe in superficial deposits.
- BH11 was fitted with a standpipe in superficial deposits.

All installations were fitted with flush covers.

6.7 Hand Dug Pits

8 no. hand dug inspection pits were completed during Week 3 for the avoidance of services during the commencement of new borehole and probing positions.

6.8 In Situ Tests

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Standard Penetration Tests (SPT) were conducted at regular intervals during drilling.

Dynamic Cone Penetration (DCP) tests were conducted at regular intervals along the viewpoint footpath to delineate a bedrock profile. The DCPs were named DP01 to DP05 in increasing distance from BH06. The tests were conducted in a superheavy arrangement using the terrier rigs SPT hammer. Termination depths of the probes varied between 2.2m (DP03) and 3.6 (DP05). It should be noted that the DCPs were likely able to penetrate the weathered layers of siltstone observed within the windowless sample boreholes.

7 Financial (excluded)

8 Land and Access

8.1 Landowner Access Agreements

Permission to track the windowless sample rig over the raised decking to the rear of New Gardenstown Church was agreed prior to the commencement of BH11.

8.2 Landowner Issues

No landowner issues have been raised during Week 3.

9 Ecology, Environment, and Archaeology

Heavy flow of groundwater encountered within bedrock in BH03 caused the migration of bedrock dust and silts into the surface water drainage, which was noted to flow directly into Gardenstown Harbour. Upon discovery of issue BAM formed silt traps with available sandbags upstream of the surface water drain. BH04 was terminated at 16m upon encountering similar groundwater conditions to avoid similar issue.

10 Site Visits and Meetings

Due to 'Red' and 'Amber' weather warnings in place over much of Scotland, the weekly progress meeting on site due to occur on Friday 02/03/18 has been cancelled.

11 Programme for Forthcoming Week

11.1 Works for the forthcoming week to comprise:

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- Roped access equipment to be mobilised to site on Monday.
- Skid rig boreholes to be undertaken on slope face.
- PANDA probing to be undertaken on slope face.

Refer to Table 3 for proposed numbers and anticipated meterage of boreholes in Week 3.

12 Other Issues

At present no preliminary engineering logs or testing schedules have been provided.

AGS versions of the drillers logs have been requested.

13 Progress Charts

Progress is summarised in Table 3 and Figures 1 to 2 below. It should be noted that as the scope of the investigation is intended to be flexible and adapted based on conditions on site the scheduled number and depth of exploratory holes may vary from week to week.

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Table 3. Progress: Week 3

		Cable Percussive				Rotary Core				Rotary Open				Windowless Sample				Dynamic Cone Penetration	
		Number		Metres		Number		Metres		Number		Metres		Number		Metres		Number	Metres
Week 1	Complete	2	-	8	-	0	-	0	-	0	-	0	-	0	-	0	-	-	-
Week 2	Proposed	3	-	15	-	2	-	30	-	0	-	0	-	1	-	5	-	-	-
	Complete	3	-	18.2	-	2	-	39	-	0	-	0	-	0	-	0	-	-	-
Week 3	Proposed	-	-	-	-	3	-	30	-	1	-	5	-	2	-	10	-	-	-
	Complete	-	-	-	-	3 ⁽¹⁾	-	26.4	-	-	-	-	-	3 ⁽²⁾	-	6.85	-	5 ⁽³⁾	-
Week 4	Proposed	-	-	-	-	-	-	-	-	3 ⁽⁴⁾	-	30	-	3 ⁽⁴⁾	-	15	-	-	-
Total	Complete	5	100%	27.2	100%	5 ⁽¹⁾	100%	65.4	100%	1	-	5	-	3	-	6.85	-	5	-
	Scope	5		25		6		70		3	-	30	-	4	-	20	-	-	-

Note:

1. No rotary coring completed at BH06 due to limitations of equipment and space.
2. Additional WS completed in place of DCP probing.
3. DCP probing conducted at regular intervals along footpath
4. Exact number of WS and RO boreholes on slope face during Week 4 is TBC.

